ADVANCE SIGNAL GENERATOR

Type E2

INSTRUCTIONS

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Introduction

This Generator, with its wide frequency range and accurate attenuator system, will enable measurements on selectivity and sensitivity to be made on radio and television receivers with a degree of accuracy sufficient for all practical purposes. Provision is made for external modulation with low power input up to 10 k/cs. as well as for 400 c/s. 30% internal modulation. The frequency range covers 100 kc/s. - 100 Mc/s., thus embracing television and 90 Mc/s. communications bands on fundamentals.

Instructions

MAINS VOLTAGE

The instrument is normally despatched with mains transformer set to operate from 210 - 250 volts supplies. For 105 - 125 volts it is necessary to change the tapping. To do this: Remove the disc on the underside of the case, exposing the mains transformer. For 210 - 250 volts input tag 2 is connected to tag 3. For 105 - 125 volts remove the connection between tag 2 and tag 3. Connect tag 1 to tag 2 and tag 3 to tag 4. Replace the cover disc.

The instrument is suitable for A.C. supplies ONLY at frequencies between 40 c/s. and 100 c/s.

ACCESSORIES SUPPLIED WITH THE INSTRUMENT

1 Terminal Pad and Dummy Aerial, Type TP.1.
1 Shielded R.F. lead type PL.21, complete with plug and socket.
1 A.F. lead, type PL.22, complete with plug and crocodile clips.

VALVES, ETC.

1 Valve type ECC91 Mullard (6J6).
1 Valve type 6SN7GT.
1 Valve type 6X5G.
1 Pilot lamp type MES 11 mm. 6.5 volts.

FREQUENCY

A signal of any frequency between 100 kc/s. and 100 Mc/s. is obtainable to an accuracy of ± 1% by means of a directly calibrated scale and a 6 wave-band selector switch; the bands being :

A.	30 - 100 Mc/s.
B.	10 - 30 Mc/s.
C.	3 - 10 Mc/s.
D.	1 - 3 Mc/s.
E.	300 - 1,000 kc/s.
F.	100 - 300 kc/s.

FULL R.F.

At the " FULL R.F." socket, output is 1V. approx. uncontrolled by the attenuators. For the full output the load impedance should be not less than 1,000 ohms.

R.F. ATTENUATORS

The signal from the " ATTEN. R.F." socket is controlled by two attenuators. The output from the oscillator section is fed to the non-inductive " VOLTAGE OUTPUT " potentiometer. The output from this is fed to the " MULTIPLIER," a five-step attenuator calibrated: X1, X10, X100 μV. and X1, X10 m.V. Thus, multiplying the indication of the two controls, output varies from 1 microvolt to 100 millivolts. The output impedance is 75 ohms except on step X10 mV. when it varies from 45-53 ohms according to the setting of the " VOLTAGE OUTPUT " attenuator.

Note.—These outputs are correct only when the output plug is terminated with a 75 ohm load, such as connector type PL.21 and terminal pad TP.1.

R.F. OUTPUT

The output from "ATTEN. RF." socket is obtained at the end of the matched 75 ohm connector PL.21 into a 75 ohm load or the terminal pad TP.1.

The output into a 75 ohm load is that indicated by the attenuators.

Using the TP.1 terminal pad the following are obtained:—

1. Output impedance 37 ohms and voltage as indicated:
2. Output impedance 10 ohms and voltage one-tenth of that indicated;
3. Output impedance that of a standard all-wave dummy aerial and voltage one-tenth of that indicated.

See also separate instruction sheet on Pad Type TP.1.

At frequencies above 10 Mc/s the connection from the pad to the receiver should be as short as possible, and not more than three inches.

AUDIO FREQUENCY

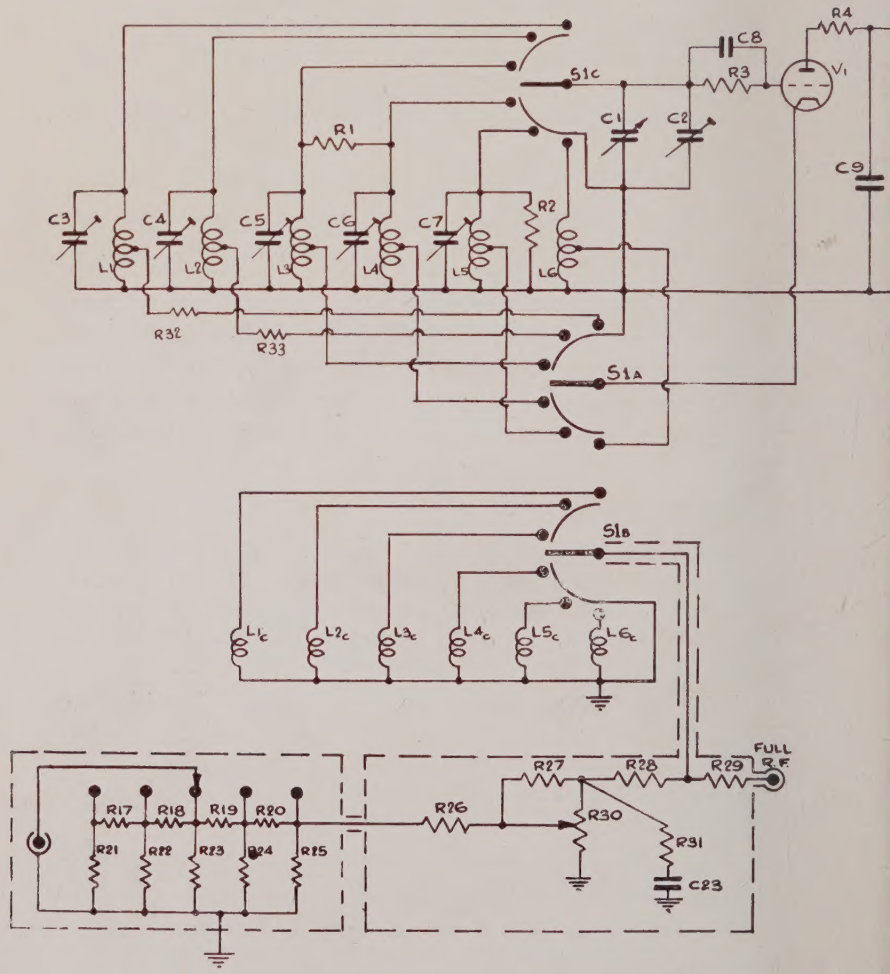
When the "MOD" switch is in the "INT" position the carrier output is modulated 30% at 400 c/s. The A.F. control, which is combined with the mains on-off switch, varies A.F. voltage (400 c/s. available at the A.F. socket) from 0 - 20 volts, the impedance varying from 0 - 10,000 ohms.

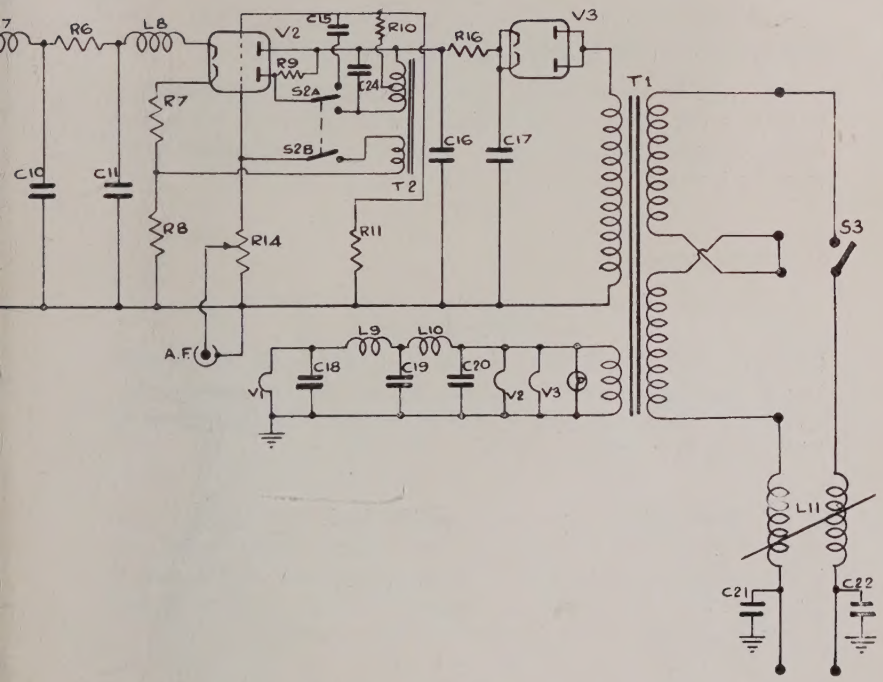
When the "MOD" switch is in the "CW-EXT" position the carrier is normally unmodulated. For external modulation inject an A.F. signal from an external source into the A.F. socket WITH THE A.F. CONTROL AT **MAXIMUM.** External modulation is obtainable from 10 c/s. to 10 kc/s.

The maximum undistorted modulation is 80% at low frequencies, falling off as the frequency rises.

For modulation frequencies less than 1/50th of the carrier maximum modulation is 80% at 4,000 c/s., falling to 40% at 10 kc/s.

Modulation depth = 10 X input voltage %.
Input impedance = 50,000 ohms.


R4
C8
R3
V1
S1C
C1
C2
C9
R1
C3
C4
C5
C6
C7
R2
L1
L2
L3
L4
L5
L6
R32
R33
S1A
S1B
L1C
L2C
L3C
L4C
L5C
L6C
FULL R.F.
R27
R28
R29
R17
R18
R19
R20
R26
R30
R31
R21
R22
R23
R24
R25
C23


R6
L8
V2
C15
R10
V3
R16
R9
S2A
C24
R7
S2B
T2
C16
C17
T1
S3
C10
C11
R8
R14
R11
A.F.
L9
L10
C18
C19
C20
V1
V2
V3
L11
C21
C22

CONNECTOR TYPE PL.22

This connector, which has crocodile clips at one end, is to be used for A.F. testing and I.F. alignment.

CONNECTION TO POINTS OF HIGH POTENTIAL

It must be remembered that all outputs have low resistance paths to earth. Therefore if a signal is to be injected into apparatus at a point which has high potential to earth, a blocking condenser must be inserted in series with the generator output.

MAINTENANCE

To remove the instrument from the case proceed as follows:—

REMOVE THE DOME NUT FROM THE REAR OF THE CASE: Lay the instrument on its back and remove the four screws in the corners of the panel, each a little at a time. The panel will be lifted from the case.

To Reassemble : Lay the case on its back and replace instrument. Engage the threads of the corner screws, stand the instrument upright and carefully screw up the panel evenly, making sure that the back chassis bolt appears through its clearing hole in the case. The dome nut must then be replaced.

The ECC91 valve is in an internal screening box holding the oscillator assembly. To open this box remove the pilot lamp-bracket and undo the self-tapping screws on the edges of the box. Care must be taken not to disturb the trimmers and coil assembly. The trimmers MUST ON NO ACCOUNT be adjusted, as this will make the frequency calibration incorrect. The ECC91 oscillator valve may be replaced without appreciable effect on the calibration. To ensure reliable screening ALL screws must be replaced when the screen is refitted.

In all cases of difficulty the instrument should be returned to the factory for repair or adjustment.

CIRCUIT CODE

R 1.	6,800 ohms	± 20%	¼W.	R19.	750 ohms	± 5%	¼W.
R 2.	2,200 „	„	„	R20.	„ „	„	„
R 3.	10,000 „	± 10%	„	R21.	82 „	„	„
R 4.	22 „	± 20%	„	R22.	91 „	„	„
R 5.	33,000 „	„	„	R23.	„ „	„	„
R 6.	1,000 „	„	„	R24.	„ „	„	„
R 7.	390 „	± 10%	„	R25.	„ „	„	„
R 8.	1,800 „	„	„	R26.	100 „	„	„
R 9.	33,000 „	„	½W.	R27.	180 „	„	„
R10.	220,000 „	„	¼W.	R28.	100 „	„	„
R11.	100,000 „	„	„	R29.	56 „	± 10%	„
R14.	50,000 „	Carbon Potentiometer.		R30.	91 „	Low Inductance Potentiometer	
R16.	1,000 ohms	± 20%	½W.	R31.	82 ohms	± 5%	¼W.
R17.	750 „	± 5%	¼W.	R32.	2,200 „	± 20%	„
R18.	„ „	„	„	R33.	1,500 „	„	„

C 1.	.... 500 pF	....	....	Variable Condenser	
C 2.	.... 30 pF	....	....	Phillips Trimmer	
C 3.	.... „	....	....	Comp.	„
C 4.	.... „	....	....	„	„
C 5.	.... „	....	....	„	„
C 6.	.... „	....	....	„	„
C 7.	.... „	....	....	„	„
C 8.	.... 100 pF	....	.... ± 10%	Moulded Mica	
C 9.	.... 2,000 pF	....	.... ± 20%	„	„
C10.	.... 1,000 pF	....	.... „	„	„
C11.	.... „	....	.... „	„	„

C15.	....	.25	mfd.	....	....	± 20%	Paper Tubular
C16.	....	16	,,	....	....	350v.	Electrolytic
C17.	....	,,	,,	....			
C18.	....	2,000	pF	....	....	± 10%	Mica Moulded
C19.	....	5,000	pF	....	....	,,	,, ,,
C20.	....	,,	,,	....	....	,,	,, ,,
C21.	....	,,	,,	....	....	,,	,, ,,
C22.	....	,,	,,	....	....	,,	,, ,,
C23.	....	40	pF	....	....	± 20%	Ceramic
C24.	....	.05	mfd.	....	....	,,	Paper Tubular

L1. Coil Osc.
L1c. Coil Coupling.
L2. Coil Osc.
L2c. Coil Coupling.
L3. Coil Osc.
L3c. Coil Coupling.
L4. Coil. Osc.
L4a. Coil Coupling.
L5. Coil Osc.
L5c. Coil Coupling.
L6. Coil Osc.
L6c. Coil Coupling.
L7. H.T. R.F. Choke.
L8. H.T. R.F. Choke.
L9. L.T. R.F. Choke.
L.10 L.T. R.F. Choke.
L.11. Mains R.F. Choke.

S1.A, S1.B, S1.C } Band / Wave / Change

S2.A, S2.B } Mod. Switch

S.3 Mains On-off Switch.

V.1 ECC91 — RF. Osc.
V.2 6SN7GT — Modulator.
V.3 6X5G — Rectifier.

T.1 Mains Transformer.
T.2 Modulator Transformer.

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Fox Printing Press (T.U.),